6.4.4 TROUBLESHOOTING

Contact the instrument manufacturer if the suggestions in table 6.4–2 fail to resolve the problem.

- If available, use a commercial pH electronic calibrator to check the pH meter function.
- A large percentage of all problems encountered during pH calibration and measurement can be attributed directly to problems with the pH electrode—refer to 6.4.1.B.
- New electrodes are susceptible to some of the problems listed in table 6.4–2, and they may need reconditioning before they can be used.
- Check the voltage of the batteries. Always have good batteries in instruments and carry spares.

Table 6.4–2. Troubleshooting guide for pH measurement

[*M*, molar; HCl, hydrochloric acid; KCl, potassium chloride; °C, degrees Celsius; ~, about]

Symptom	Possible cause and corrective action
Instrument system will not calibrate full scale	• Buffers may be contaminated or old—use fresh buffers. • Faulty electrode—recondition electrode (see discussion in section 6.4.1 on electrode maintenance, cleaning, and storage). • Weak batteries—replace.
Slow response time	For liquid-filled electrodes: • Weak filling solution—change filling solution (section 6.4.1). • No filling solution—add fresh solution (section 6.4.1). • Dirty tip—clean with soap solution. **Do not scratch electrode tip.** • Chemical deposits—place electrode in a 0.1 *M* HCl solution for about 30 minutes. • Clogged or partially clogged junction—unclog by placing electrode tip in 0.1 *M* KCl solution at 90°C for about 15 minutes. **Do not boil calomel electrodes** (section 6.4.1). • Water is cold or of low ionic strength—longer equilibration time is needed (be patient). • Weak batteries—replace with new batteries. For gel-filled electrodes: • Dirty bulb—rinse with deionized water. • Clogged junction—liquify gel by placing electrode into warm (~60°C) water for one minute or less.
Erratic readings	• Loose or defective connections—tighten, clean, or replace connections. • Broken or defective cable—repair or replace cable. • Static charge—polish face of meter with antistatic solution. • Loose battery connection—tighten. • Air bubbles in the electrode bulb—shake gently. • Too much pressure in flowthrough chamber—reduce pressure. • Weak batteries—replace with new batteries.